1. A method of isolating a first species of nucleic acid molecule from a cell, the method comprising the steps of:

(a) providing a cell;

(b) preparing a first combination by simultaneously adding to the cell one or more reagent components collectively referred to as a first reagent, wherein the first reagent is formulated to cause lysis of the cell, wherein the first reagent comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that binds nucleic acid molecules, wherein the nucleic acid precipitating reagent is present in sufficient concentration to precipitate the first species of nucleic acid molecule;

(c) maintaining the first combination under conditions that permit the adsorption of the precipitated nucleic acid molecule to the solid phase carrier, thereby producing a solid phase carrier having bound thereto the first species of nucleic acid molecule; and

(d) removing the carrier having bound thereto the first species of nucleic acid molecule from the first combination, thereby isolating the first species of nucleic acid molecule from the mixture and producing a second mixture.

2. The method of claim 1, wherein the nucleic acid precipitating reagent of the first reagent is a polyalkylene glycol.

3. The method of claim 2, wherein the polyalkylene glycol is polyethylene glycol (PEG).

4. The method of claim 1, wherein the first reagent is added to the cell by a multisample transfer device.

5. The method of claim 1, wherein the solid phase carrier of the first reagent is a magnetically responsive solid phase carrier.

6. The method of claim 5, wherein the solid phase carrier comprises a functional group coated surface.

7. The method of claim 6, wherein the solid phase carrier is an amine-coated paramagnetic microparticle.

8. The method of claim 6, wherein the solid phase carrier is a carboxyl-coated paramagnetic microparticle.

9. The method of claim 6, wherein the solid phase carrier is an encapsulated carboxyl group-coated paramagnetic microparticle.

10. The method of claim 6, wherein the pH of the first reagent is formulated to adjust the binding affinity of the functional group to the first species of nucleic acid molecule.

11. The method of claim 1, wherein the solid phase carrier of the first reagent is removed by applying a magnetic field, applying vacuum filtration, or by centrifugation.

12. The method of claim 3, wherein the first reagent further comprises a salt selected from the group consisting of sodium chloride, magnesium chloride, calcium chloride, potassium chloride, lithium chloride, barium chloride and cesium chloride.

13. The method of claim 1, wherein the first reagent consists of one reagent component.

14. The method of claim 1, wherein the solid phase carrier reversibly binds nucleic acid molecules.

15. The method of claim 1, further comprising isolating a second species of nucleic acid molecules from the second mixture, the method further comprising the steps of:

(e) preparing a second combination by simultaneously adding to the second mixture one or more reagent components collectively referred to as a second reagent, wherein the second reagent comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that binds nucleic acid molecules, wherein the precipitating reagent is present in sufficient concentrations to precipitate the second species of nucleic acid molecule;

(f) maintaining the second combination under conditions appropriate for the adsorption of the second target species of nucleic acid molecule to the surface of the solid phase carrier, thereby producing a solid phase carrier having the second species of nucleic acid molecule bound thereto; and

(g) removing the solid phase carrier having the second species of nucleic acid molecule adsorbed thereto from the second combination.

16. The method of claim 15, further comprising the step of:

(h) eluting the second species of nucleic acid molecules from the solid phase carrier, thereby selectively isolating an second species of nucleic acid molecules.

17. The method of claim 15, wherein the second species is of a smaller molecular size than the first species removed in step (d).

18. The method of claim 15, wherein the nucleic acid precipitating reagent of the second reagent is a polyalkylene glycol.

19. The method of claim 18, wherein the polyalkylene glycol is PEG.

20. The method of claim 15, wherein the second reagent is added to the second mixture by a multisample transfer device.

21. The method of claim 15, wherein the solid phase carrier of the second reagent is a magnetically responsive solid phase carrier.

22. The method of claim 21, wherein the solid phase carrier comprises a functional group coated surface.

23. The method of claim 22, wherein the solid phase carrier is an amine-coated paramagnetic microparticle.

24. The method of claim 22, wherein the solid phase carrier is a carboxyl-coated paramagnetic microparticle.

25. The method of claim 22, wherein the solid phase carrier is an encapsulated carboxyl group-coated paramagnetic microparticle.

26. The method of claim 15, wherein the solid phase carrier of the second reagent is removed by applying a magnetic field, applying vacuum filtration, or by centrifugation.

27. The method of claim 19, wherein the second reagent further comprises a salt selected from the group consisting of sodium chloride, magnesium chloride, calcium chloride, potassium chloride, lithium chloride, barium chloride and cesium chloride.

28. The method of claim 15, wherein the second reagent consists of one reagent component.

29. The method of claim 15, wherein the solid phase carrier reversibly binds nucleic acid molecules.

30. The method of claim 20, wherein the first reagent comprises polyethylene glycol and salt in concentrations that result in the binding of the first species of nucleic acid molecule to the solid phase carrier in step (c), but does not result in the binding of the second species of nucleic acid molecule to the solid phase carrier in step (c).

31. The method of claim 20, wherein the polyethylene glycol has an average molecular weight of about 8,000, and the polyethylene glycol concentration of the first combination is between about 1% and 4% and the polyethylene glycol concentration of the second combination is at least 7%.

32. A method of isolating a nucleic acid molecule from a cell, the method comprising adding to the cell one or more reagent components collectively referred to as a first reagent, wherein the first reagent causes the lysis of the cell and comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that reversibly binds a nucleic acid molecule of the cell.

33. The method of claim 32, further comprising removing the solid phase carrier with a first species of nucleic acid attached thereto, to generate a first mixture.

34. The method of claim 33, further comprising adding to the first mixture one or more reagent components collectively referred to as a second reagent, wherein the second reagent comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that reversibly binds a nucleic acid molecule of the cell.

35. A composition for isolating nucleic acids, wherein the composition comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that binds nucleic acid molecules, wherein the composition is formulated to cause the lysis of a cell, wherein the composition lacks one or more of nucleic acids, cells, or cellular lysate.

36. The composition of claim 35, wherein the composition comprises PEG and salt.

37. The composition of claim 35, wherein the PEG and salt are present in sufficient concentration to selectively precipitate nucleic acid molecules greater 10 kb when the composition is added to a cell.

38. The composition of claim 36, wherein the concentration of PEG is formulated to be between about 1-4% when the composition is added to a cell.

39. The composition of claim 36, wherein the concentration of salt is formulated to be at least 0.5M when the composition is added to a cell.

40. The composition of claim 34, wherein the pH of the composition is formulated to adjust the binding affinity of the surface of the solid phase carrier to nucleic acid molecules.

41. A composition for isolating nucleic acids, wherein the composition comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that reversibly binds nucleic acid molecules, wherein the composition lacks one or more of nucleic acids, cells, or cellular lysate.

42. The composition of claim 41, wherein the composition comprises PEG and salt.

43. The composition of claim 42, wherein the PEG and salt are present in sufficient concentration to selectively precipitate nucleic acid molecules greater 2.4 kb when the composition is added to a cell.

44. The composition of claim 43, wherein the concentration of PEG is formulated to be at least 7% when the composition is added to a cell.

45. The composition of claim 43, wherein the concentration of salt is formulated to be between less than 0.55M when the composition is added to a cell.

46. A kit for isolating nucleic acids, comprising:

a first composition, wherein the first composition comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that binds nucleic acid

molecules, wherein the first composition is formulated to cause the lysis of a cell, wherein the first composition lacks one or more of nucleic acids, cells, or cellular lysate; and

a second composition, wherein the second composition comprises a nucleic acid precipitating reagent and a solid phase carrier having a surface that reversibly binds nucleic acid molecules, wherein the second composition lacks one or more of nucleic acids, cells, or cellular lysate.

47. The kit of claim 46, further comprising a third composition and a fourth composition, wherein the third composition dissolves impurities but not nucleic acids bound to a solid phase carrier, and wherein the fourth composition is a low ionic strength buffer.

48. The kit of claim 46, further comprising a magnetic plate holder appropriate for applying a magnetic field of at least about 1000 Gauss to the wells of a microtiter plate, wherein the magnet comprises at least one N35 magnet.